SEMINAR ON SYSTEM EVALUATION

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Demand-actuated urban public transportation services currently are supplied by taxis and, in some places, by airport limousines, school buses, and jitneys. The possibility of developing new systems employing radio-dispatched minibuses was recognized at least as early as 1963 when the city of Menlo Park, California, conducted a limited experiment with an improvised system called dial-a-bus and filed a grant application with the U. S. Housing and Home Finance Agency.

During a recent period—about 4 years—the concept has had considerable attention from the community of professional research analysts and the Urban Mass Transportation Administration. There are small-scale demonstrations in Haddonfield, New Jersey, and Rochester, New York, and a valuable demonstration has been undertaken by the Government of Ontario in Toronto, Canada.

The degree of interest that is being shown by researchers and civil servants is not necessarily a good indication of the value of the dial-a-bus system. Therefore, in this seminar an effort was made to consider the value of the system from the viewpoints of several other groups who must lend support if the system is to enjoy significant success. A number of evaluation-oriented questions were considered from the viewpoints of operators, owners, patrons, and labor.

OPERATOR VIEWS

How Can Dial-a-Bus Be Used?

A considerable variety of operating patterns and services have been discussed. Among these are the following:

1. Flexibly routed, scheduled buses (Mansfield, Ohio);
2. Many-to-one service coordinated with scheduled commuter trains (Toronto, Canada);
3. Many-to-one service for rail rapid transit (Haddonfield, New Jersey);
4. Many-to-many service providing area-wide coverage (M.I.T., GM, and WABCO studies); and
5. Many-to-many service especially for nondrivers and local travel (one member of the Stanford Research Institute family of "future urban transportation systems").

The first three of these patterns and services are attainable currently but offer the potential for only a relatively small-scale contribution to the solution of urban public transportation problems. The fourth is attainable now also and offers the potential for large-scale contributions as will be shown later. The fifth pattern depends on the existence of a number of other advanced systems that have not been developed yet and, therefore, is only a long term possibility.

What Is the Possible National Potential for Dial-a-Bus?

It may be useful to develop some rough estimates of the possible national scale of dial-a-bus service over the next 10 to 15 years. During that period, dial-a-bus would face little or no competition from other new modes and, because it makes only limited use of fixed facilities, dial-a-bus could be introduced quickly and expanded rapidly in many communities.

Work at M.I.T. has suggested, tentatively, that dial-a-bus operations may be economical and attractive for areas with population densities of 2,000 persons per square mile and may remain attractive, in comparison with scheduled buses, for higher densities up to 6,000 persons per square mile. In the United States, approximately 60 million people will reside in areas within that range of densities 15 years hence.

Possible demands for dial-a-bus service were estimated in the same rough fashion. Using data from the case study described by GM staff members, we estimate that dial-a-bus service may be suitable for about one trip per day per person in the area served. Also, we estimate that dial-a-bus patronage may be in the range of 3.6 to 14.9 percent depending on fares and service quality.

These estimates, considered together, suggest that the national potential of dial-a-bus may be quite large. Areas populated by 60 million persons might be served; 60 million trips per day might be candidates for dial-a-bus service; and 2,150,000 to 9,000,000 trips per day might be taken on dial-a-bus vehicles. If the cost of providing service averaged $1, the total national outlays for dial-a-bus services would fall in the range of $650 million to $2,700 million per year. To help put these numbers in perspective, we note that total outlays in 1967 for all modes of urban public transportation—including taxis and school buses—was about $3,400 million.

What Kind of Service Can Be Offered?

The services of dial-a-bus can be tailored over a wide range. The descriptors used by GM are the maximum delay (i. e., waiting time between calling for service and boarding the vehicle) and the speed of dial-a-bus expressed as a multiple of the travel time that would be required by a private automobile. Their case study treated 15- and 25-minute delays and travel times 2 and 3 times as long as automobile travel time. M.I.T. researchers have combined the 2 factors and expressed the entire trip time by dial-a-bus as a multiple of automobile travel time. It is evident that the cost of providing service will increase as the system operator takes measures to reduce delays and travel times. A spokesman for M.I.T. suggested that providing service becomes expensive if the trip time is shorter than 2.5 multiples of automobile trip time. Clearly, there is no need for the operator to offer just one service; for example, he could offer priority service with a short trip time and a high fare and service with a lower priority with longer trip times and lower fares.

Do Operators Recognize Problems in Dial-a-Bus?

There is no large body of operator experience, and prospective operators have little understanding of the system or of its problems. However, the limited evidence available suggests that prospective operators will be concerned about matters such as use of computers, ability of customers to use the phone to order service, lack of predictable routes and work patterns for drivers, inability to maintain control over drivers via radio, and maintenance of services on snow-covered streets. However, transit operators informed about dial-a-bus have expressed a moderately optimistic view of the potential of the system to provide new services and growth for their industry.

OWNER VIEWS

Who Will Own Dial-a-Bus Systems?

Resolution of the question of private versus public ownership is expected to depend on whether dial-a-bus will be a self-sustaining operation. If fares and other business

revenues are sufficient to cover costs and recover capital with a profit, private ownership would be feasible; however, if subsidies must be paid by government, public ownership would be likely. The costs of providing dial-a-bus service will be influenced considerably by rates of pay for labor, and these will vary among geographical areas. Therefore, private ownership may be a realistic goal in some areas and not in others.

Are There Any New Conditions Favoring Private Ownership?

The basic elements of a dial-a-bus system—small buses and radio dispatching—have been available for many years but have not been exploited by private business. Is it possible that recent developments—technical or nontechnical—may provide the last required elements for action by entrepreneurs? Many private businesses have tried to establish new types of demand-actuated urban public transportation service—over a period of 50 or 60 years—but few if any have prospered. The reasons for failures are not understood. It seems possible that the impacts of recent development have not yet been assessed by entrepreneurs. It is encouraging that interest in dial-a-bus is being shown by some of the remaining private bus operators and by taxi operators as well.

Do the Changes Favor Public Ownership?

The same opportunities for innovation have existed for public transportation agencies and, for reasons poorly understood, the innovations have not occurred. The public policy shifts that have caused government agencies to enter the field of urban public transportation may produce the conditions required for large-scale use of dial-a-bus. At the federal level, the Urban Mass Transportation Administration has supported research and development programs that were beyond the capabilities (or the willingness to pay) of industry and will also conduct demonstrations. The large capital grants program of the federal government can be regarded as confirmation of the analyst's claim that urban public transportation provides benefits worthy of taxpayers' support. Agencies at the state, regional, and local levels are becoming increasingly involved in financing and operating urban public transportation systems and are finding that the demands for service do not match capabilities of available systems. Therefore, it is possible that public agencies will soon recognize dial-a-bus as a new and valuable tool and begin its use.

What About Costs and Fares?

If ownership were private, it would be necessary for fares and other revenues (possibly from businesses served) to cover operating costs plus capital recovery and a return on investment. According to M.I.T. researchers, fares might be 80 cents; however, the GM case study, for a different and perhaps especially difficult situation, found that fares would need to be $1.25.

With public ownership, fares can be low—possibly no more than the 30 to 50 cents commonly paid for bus and rapid transit service. Deficits of the public agency would have to be covered by tax-based subsidies. The case study by GM showed that the patronage of of its demand-jitney system would vary depending on fares and service, and the influence of fares was quite significant. Profitable operation by a private organization appeared possible in only one case when fares were high ($1.25) and patronage was at the lowest level (3.6 percent). Maximum use (14.9 percent) occurred when fares were low (50 cents). In that case the traveler paid only about half of the cost of service, and presumably a subsidy of about 50 cents would be required. The proponents of subsidies argue convincingly that the use of transit as well as the increased use of transit induced by lower fares benefits society in many ways that cannot be converted directly to revenue for the operator. Will the public (or public transit agencies) prefer the higher patronage and its benefits along with lower fares and subsidies? This question may have to be answered, specifically, in dozens of communities if dial-a-bus is to have a significant large-scale application.

PATRONAGE VIEWS

Who Will Ride the System?

It is a common practice to view urban public transportation as an alternate to the private automobile and sometimes to cast the public and private modes as competitors. That view neglects the great differences in availability of travel services to various groups of travelers.

In 1967 there were about 156 million people (excluding children under age 10, persons in institutions, and persons overseas) in the United States requiring individual mobility and about half as many automobiles and small trucks. Also, there were about 1.2 licensed drivers per vehicle. Thus, half of the individuals were drivers with first claim to a vehicle. This class has essentially full mobility and would have little or no need for the services of dial-a-bus. Another 17 million individuals (11 percent) had drivers licenses but had only second or lower claim to a vehicle. This group suffers some degree of limited mobility and would have at least occasional need and perhaps regular need for dial-a-bus service. About 19 million children between the ages of 10 and 16 and about 12 million older children and adults (comprising 20 percent of the travelers) do not have drivers licenses but live in households having one or more vehicles. These people are often served as passengers by other family members but would make considerable use of dial-a-bus. Finally there were about 30 million persons (19 percent) living in households without automobiles who would probably depend heavily on dial-a-bus.

It appears that the benefits to society from dial-a-bus (as well as other public modes of travel) will be valuable when service is provided to the limited mobility groups, and especially to those individuals with severe limitations who are found in greatest numbers in the low-income districts of cities. Middle-class communities offer favorable settings for early tests and small-scale demonstrations of dial-a-bus; but ultimately the value of the system will need to be determined in more difficult environments.

Employment of dial-a-bus need not be focused entirely on any group or area. Dial-a-bus will need to be marketed, and its image should be developed to appeal to everyone requiring service rather than to certain market groups. A similar image will be desirable when a dial-a-bus program must obtain the approval of voters.

LABOR VIEWS

Will labor unions favor dial-a-bus? A favorable evaluation of dial-a-bus by organized labor may be one of the most essential factors in determining whether the system will succeed. It would appear that the labor-intensive character as well as the wide applicability of dial-a-bus (in comparison with scheduled buses and rail rapid transit) would be appealing because of the new jobs that would be created. However, dial-a-bus will present some new labor-management problems. For example, close disciplinary control will be required to make efficient use of vehicles and to avoid deterioration of service. Drivers will be required to follow instructions more closely than is necessary for either taxi or bus operation. Also, in a highly automated system vehicle movements can be monitored closely and, if desired, can be reviewed at a later time. Responses of labor, thus far, have been highly favorable to the dial-a-bus concept.